

REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the foregoing amendments and the following remarks.

Claim Status

Claims 1-17 were originally filed. Claims 18-19 were previously added in a preliminary amendment. Currently, claims 1 - 19 have been amended. Claims 1-19 are pending.

§103 Rejections

Claims 1-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application No. 2002/0046872 (hereinafter "Smalley '872") in view of U.S. Patent No. 7,365,100 (hereinafter "Kuper") in further view of U.S. Patent Application No. 2004/0038251 (hereinafter "Smalley '251"). Applicant respectfully traverses.

All claims have been amended to indicate that the instant invention describes a non-aqueous carbon nanotube dispersion liquid. M.P.E.P. §2163.06 clearly states that "information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter." One skilled in the art would clearly recognize that the instant invention describes a

non-aqueous carbon nanotube dispersion. These amendments do not introduce new matter to the instant invention as it is clearly demonstrated each of Examples 1 through 14 utilize a non-aqueous carbon nanotube dispersion liquid.

From the specification of the instant application it is clearly stated that an aqueous solvent and an organic solvent may be combined to be used as a solvent for dispersing carbon nanotubes. However, researchers have found that carbon nanotubes tend to form a bundle-like or rope-like structure due to the van der Waals' forces. The smooth surface of the nanotube results in a reduced affinity for the solvent which makes it very difficult to achieve a polymer-based nanocomposite which is uniformly dispersed within that solvent. This has severely limited the useful applications of carbon nanotubes.

As stated in the instant specification, numerous attempts have been made to overcome these limitations. (See Specification, Page 3, Line 18 - Page 4, Line 19). For example, JP-A-2000-86219 describes a method of dispersing a carbon nanotube in acetone under ultrasonic irradiation. However, the carbon nanotube molecules start to aggregate after the ultrasonic irradiation is ceased, resulting in the molecules becoming entangled when the carbon nanotube concentration is high. Additionally, a method of using a nonionic surfactant TERGITOL (trademark) NP7 under ultrasonication

has been proposed. However, it is reported that, when the amount of the carbon nanotube is increased in the method, the carbon nanotube is aggregated, failing to obtain a uniform dispersion (see S. Cui, et al., *Carbon*, 41, 2003, 797-809). Each of the previous attempts to overcome the problems associated with van der Waals' forces has attempted to use a water-based solvent which has met with less than satisfactory results.

In order to overcome the shortcomings listed above, the instant invention uses a non-aqueous carbon nanotube dispersion liquid to disperse carbon nanotubes. The non-aqueous carbon nanotube dispersion liquid of the instant invention clearly demonstrates both its ability to achieve uniform dispersion of carbon nanotubes and to maintain that uniform dispersion for more than 30 days. (Specification, Examples 1-14).

The Examiner's reliance on Smalley'872, Kuper and Smalley'251 regarding amended independent claims 1, 2, 12 and 14 is misplaced.

Smalley'872 describes the dispersion of carbon nanotubes in a water-based solvent, as pointed out by the Examiner, in paragraphs [0064], [0076] and [0077]. This is contrary to the instant invention as the instant invention does not make use of a water-based (aqueous) solvent. Furthermore, Kuper does not use, or even mention within its specification, the use of a polyvinylpyrrolidone (PVP), which is an essential component of the instant invention.

The Examiner's attempt to combine Smalley'872, which relates to the dispersion of carbon nanotubes in an aqueous solvent, with Kuper, which fails to even hint at or mention the use of PVP, is clearly erroneous and not permissible in the present Examination.

Additionally, the Examiner's reliance on Smalley'251, which, like Smalley'872, describes the dispersion of carbon nanotubes in an aqueous solvent, fails to be relevant to the instant Examination. Therefore, it is clear that by combining Smalley'872 and Smalley'251, which both describe the dispersion of carbon nanotubes in a water-based (aqueous) solvent, a person who is skilled in the art would not find it obvious to achieve the instant invention which relates to a dispersion of carbon nanotubes in a non-aqueous solvent.

The prior art reference or combination of references relied upon by the Examiner must teach or suggest all of the limitations of the claims. See *In re Zurko*, 111 F.3d 887, 888-89, 42 U.S.P.Q.2d 1467, 1478 (Fed. Cir. 1997); *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art."). The teachings or suggestions, as well as the expectation of success, must come from the prior art, not applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991). In this instance, from the

information detailed above, it is clear that Smalley'872, Kuper and Smalley'251 fail to teach or suggest all the limitations of Applicant's claims.

Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious. *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed. Cir. 1987); *In re Abele*, 684 F.2d 902, 910, 214 USPQ 682, 689 (CCPA 1982); see also *In re Sernaker*, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983). Hence, since independent claims 1, 2, 12 and 14 are nonobvious, dependent claims 3-11, 13 and 15-19 are also nonobvious and the rejection under §103(a) as being unpatentable over Smalley '872 in view of Kuper in further view of Smalley '251" should be removed.

The Examiner has maintained the rejection of claims 1-5, 8, 10-12, 14, 16 and 18-19 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application No. 2003/0122111 to Glatkowski (hereinafter referred to as "Glatkowski") in view of U.S. Patent Application No. 2005/0025694 to Zhang (hereinafter referred to as "Zhang"). Applicant respectfully traverses.

As stated in the previous office action, claims 1 and 2 were amended to use the transitional phrase "consisting of" in order to more clearly define each claim. The transitional phrase

"consisting of" excludes any element, step, or ingredient not specified in the claim. *In re Gray*, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) ("consisting of" defined as "closing the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith."). But see *Norian Corp. v. Stryker Corp.*, 363 F.3d 1321, 1331-32, 70 USPQ2d 1508, 1516 (Fed. Cir. 2004) (holding that a bone repair kit "consisting of" claimed chemicals was infringed by a bone repair kit including a spatula in addition to the claimed chemicals because the presence of the spatula was unrelated to the claimed invention). It is clear from the above evidence that Glatkowski's requirement of the inclusion of SDS, which is clearly not optional based on Glatkowski's disclosure (See Paragraph 131), is contrary to the instant claims. Thus, Glatkowski and Zhang fail to teach or suggest all the limitations of Applicant's claims.

Additionally, it is clear that both Glatkowski and Zhang each describe aqueous solvents in their claims and specifications. In Glatkowski, paragraph [0131] describes the use of PVP. However, the same paragraph describes the use of PVP in a aqueous solvent through the inclusion of SDS. Along the same line, Zhang describes in paragraph [0021] the use of a water-based (aqueous) solvent. As stated above, the prior art reference or combination of references relied upon by the Examiner must teach or suggest all of the

limitations of the claims. See *In re Zurko*, 111 F.3d 887, 888-89, 42 U.S.P.Q.2d 1467, 1478 (Fed. Cir. 1997); *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art."). The teachings or suggestions, as well as the expectation of success, must come from the prior art, not applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991). Accordingly, in this instance, from the information detailed above, it is clear that Glatkowski and Zhang fail to teach or suggest all the limitations of Applicant's claims. Thus, it would not be obvious for one skilled in the art to achieve the instant invention based on the disclosures of Glatkowski and Zhang and claims 1-5, 8, 10-12, 14, 16 and 18-19 should be allowed.

The Examiner has maintained the rejection of claims 1, 3-5, 6-10, 12-13 and 14-17 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application No. 2002/0046872 (hereinafter "Smalley '872") in view of U.S. Patent Application No. 2005/0025694 to Zhang (hereinafter referred to as "Zhang"). Applicant respectfully traverses.

Applicant incorporates and reiterates all of the above arguments and statements related to Smalley'872 and Zhang from above. The Examiner relies on paragraphs [0046], [0048] and [0064]

from Smalley'872. As previously stated, Smalley'872 relates to the dispersion of carbon nanotubes in an aqueous solvent which is contrary to the instant invention which relates to dispersion of carbon nanotubes in a non-aqueous solvent. In this instance, from the information detailed above, it is clear that both Smalley and Zhang, whether considered together or separately, fail to teach or suggest all the limitations of Applicant's claims, thus claims 1, 3-5, 6-10, 12-13 and 14-17 are not unpatentable under 35 U.S.C. §103(a) and the rejection should be removed.

Conclusion

In view of the foregoing, Applicant respectfully requests an early Notice of Allowance in this application.

Respectfully submitted,



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